

PROF. GEORGE RAYET.

TO the long list of astronomers recently deceased, with the greatest regret we have to add the name of Prof. George Rayet, who for five-and-twenty years directed the Observatory of Bordeaux with equal vigour and success. Born in 1839, and entering the Paris Observatory in the early 'sixties, the name of Rayet not only recalls to us the ancient history of that establishment, when its fortunes were guided by Le Verrier and Delaunay, but the forty years that separate us from that period embrace the new departures that have been made, in more than one of which Rayet may be said to have assisted. For example, at that time Le Verrier was engaged in the creation of an international bureau for the furtherance of meteorological study. The subject of weather forecasting was then in its infancy, and Le Verrier was endeavouring to give scientific accuracy and precision to the method. Into this department and the allied subject of storm warnings Rayet was early initiated. Similarly his astronomical career coincides very approximately with the time in which spectroscopic studies have been vigorously prosecuted, and in this department he laboured strenuously. It may be recalled that he was one of the observers of the famous solar eclipse of 1868, when the characteristic light of hydrogen was first perceived in the solar prominences, and we were further led to the study of the helium ray. In another direction Prof. Rayet was again a pioneer, when, in conjunction with M. Wolf, he detected that peculiar variety of gaseous star with which his name has been particularly associated. The three typical representatives found in the constellation Cygnus are now members of a tolerably large class, the spectroscopic examination of which has done much to widen our conceptions of stellar chemistry.

As professor of astronomy Rayet was much engaged in teaching, and as occupant of the chair of physical astronomy at Bordeaux he was naturally pointed out as the most appropriate director of the new observatory it was proposed to construct in that town. Since 1881 this observatory has been in full activity, and a valuable series of volumes has been issued containing the work of the director and staff. These volumes can generally be divided into two sections, one giving the results of observations, the other the details of mathematical researches. Among the observations are given the coordinates of stars, the position of comets, and nebulae and measures of double stars. In the memoirs there are signs that Prof. Rayet still retained his old fervour for meteorological study, but we have, in addition, inquiries connected with problems arising out of the construction of the International Star Chart.

In his conduct of the observatory Prof. Rayet was indefatigable; its interests he defended with energy, and his administration was able and judicious. While French science will regret his removal, his immediate associates will mourn his loss as that of a friend whose sympathy, knowledge, and experience were ever at their command. W. E. P.

NOTES.

THE annual meeting of the British Medical Association will next year be held at Exeter; the president-elect is Dr. H. Davy.

THE appointment of Prof. Hermann Thoms as director of the Pharmaceutical Institute of the University of Berlin at Dahlem is announced.

THE death is announced of Dr. Adolf Voss, director of the prehistoric section of the Royal Berlin Museum.

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WE regret to have to record the death, on July 27, of Mr. Richard Glascott Symes, who retired from service on the Geological Survey in 1900. Mr. Symes was born at Kingston, Dublin, in 1840; he joined the survey as assistant-geologist in 1863, and in 1869 was made geologist. After a long period of useful work in Ireland, he was transferred to Scotland in 1890. Most of his work will be found recorded in the Memoirs of the Geological Survey.

WITH reference to the recent correspondence in our columns concerning the Geological Survey of Canada (see NATURE, June 21, p. 175, and July 12, p. 245), Mr. A. P. Low has sent us a certified copy of a report of a committee of the Privy Council, approved by the Governor-General in Council on January 5, 1892, which reads as follows:—

“Geological Survey.

“That in accordance with the provisions of 53 Victoria, chap. 11, an act respecting the Geological Survey. . . .
2. Bell, Robert, LL.D., M.D., F.R.S.C., Assistant Director and Chief Geologist—\$2,250.00

“(Signed) JOHN J. MCGEE,

“Clerk of the Privy Council.”

A PARTY of French medical men is about to visit Germany for the purpose of inspecting the medical institutions of the country. Three days will be spent in Berlin, and other cities and towns visited will include Cologne, Frankfurt, Leipzig, Munich, Bonn, Heidelberg, and Marburg. A committee of entertainment has been formed under the presidency of Prof. von Bergmann.

STEPS are being taken by the German Government to encourage sea fisheries in view of the national importance of this industry in furnishing a recruiting ground for the navy and the mercantile marine. A fishing cutter having an auxiliary engine of twenty horse-power and every modern equipment has, says the *Cologne Gazette*, been constructed at the Government expense, and after being tested in practice, and if necessary improved, will be adopted as a model for further fishing craft which are to be built, with the assistance of grants from the Imperial Treasury.

CAPTAIN LENFANT, the French explorer, is, according to the *Siècle*, about to leave on another expedition to West Africa in order to discover, if possible, a navigable waterway connecting Lake Chad with the coast of the Atlantic. It will be remembered that in his expedition of 1903-4 Captain Lénfant ascertained that a through waterway existed along the Niger, the Benue, the Mayo-Kebbi, the Logone, and the Shari, but he was unable to follow it from beginning to end by boat, as the Mayo-Kebbi was found to be obstructed by rapids, round which it was necessary to travel by land.

ACCORDING to a Reuter telegram from St. Petersburg, violent earthquake shocks were felt on August 13 in the districts of Jarkent and Kopal, in the government of Semirechensk, Central Asia.

THE *Pioneer Mail* for July 27 states that earthquake shocks were felt at Mussorie, Lahore, Delhi, and Naggar (Kangra) on the morning of July 21.

DR. H. W. WILEY, chemist to the U.S. Department of Agriculture, has been elected president of the commission appointed by the Secretary of the Treasury, the Secretary of Commerce and Labour, and the Secretary of Agriculture to formulate rules and regulations for the enforcement in America of the pure food law. The public hearings by the commission are to begin in New York on September 17.

ACCORDING to the *Electrical Review*, the working of the electric tramways on the overhead trolley system in the neighbourhood of Berlin, and of the electric haulage system on the Teltow Canal, has interfered with the work of the magnetic observatory at Potsdam, and in consequence the Meteorological Institute recently addressed a request to the Ministry for Home Affairs asking for sanction to establish an auxiliary station for delicate magnetic registrations, while at the same time ameliorating the protective regulations for the principal institute at Potsdam. The proposal, it is stated, has now received the approval of the authorities, and preparations have been made in regard to the realisation of the scheme. It has been possible to secure a site eight miles to the south of the Potsdam Observatory, and on the northern bank of the Seddin Lake, near Kunersdorf. The exact spot selected is in a wood, and the cost of the building and instruments is estimated at 2200*l*. In order that the work may be completed as rapidly as possible, and without waiting for an estimate to be inserted in the next Budget statement, the Teltow Canal Construction Board has advanced the necessary funds unconditionally.

THE Canadian Government is still further extending the organisation of Marconi stations which it has established for communication with ships and from point to point along the coast. One of the new stations is to be at Father Point and one at Seven Islands, in the Province of Quebec. The station at Cape Race, in Newfoundland, is being enlarged. When the two new stations are completed, there will be a continuous Marconi system from Quebec to Labrador on the one side and to Cape Race on the other.

It is stated in *Science* that the Indiana University has had granted to it by the legislature of the State the management of a tract of timber land of 182 acres, on which are the openings to extensive caves and the richest blind-fish localities known. The University is in search of a graduate able and willing to conduct research work on cave animals for twelve months, beginning on September 1 next.

A PRELIMINARY report of the archæological mission which went to Abyssinia last spring has been received by the Berlin Academy of Sciences. The mission, the intention of which was to explore the ruins of the ancient city of Aksum, has made, it is stated, a plan of the site, collated inscriptions already known, and copied others discovered in the course of its researches; it has also accumulated information of great interest from an architectural as well as from an ethnical point of view.

AN exhibition of india-rubber is to be held next month in the Royal Botanic Gardens, Peradeniya, Ceylon, the object being to encourage further the growth of rubber in the island. It is thought that both Ceylon and the Malay States may soon become important sources of supply of rubber.

THE fifth biennial congress of the International Committee on Aëronautics will be held at Milan under the presidency of M. Palazzo in September next.

THE sixteenth meeting of the Italian Congress of Internal Medicine will take place in Rome in October next. The subjects proposed for discussion are:—arterio-sclerosis; fevers resembling typhoid and Malta fever; and arthritis. A report on the progress in diagnosis will be presented by Prof. Ferrannini, of Naples, and one on advances in therapeutics by Prof. Michelazzi, of Pisa.

AN International Maritime Exhibition, in celebration of a century of steam navigation, is being organised under the auspices of the League Maritime Française. It will be opened in Bordeaux on May 1 next, and remain open until the following November. A section will be devoted to colonial products which are intimately connected with the commerce of Bordeaux, and there will be pavilions devoted to ocean geography, nautical automobilism, and aerial navigation. Congresses, competitions, and lectures on maritime affairs, science, art, industry, &c., are being arranged for. The exhibition will be divided into the following groups:—marine history and fine arts; instruction; charts and instruments; navigation and commerce; navy; materials for construction; motor machines and propellers; fittings and apparatus; automobile navigation and boats of all types; aëronautics; port and harbour works; sea and river fishing; hygiene, salvage, and sports; ship's provisions, food; various industries: interior decoration of passenger steamers and yachts; mariners' and passengers' clothing, sporting attire; special furniture for passengers' steamers and yachts, &c.; travelling articles, &c.; commercial relations of Bordeaux with the colonies; social economy; and works of mutuality and charity.

THE fourteenth meeting of the International Congress of Hygiene and Demography will be held in Berlin from September 23 to September 29 of next year. The congress will be divided into eight sections, devoted to the following subjects:—hygienic microbiology and parasitology; hygiene of nutrition and hygienic physiology; hygiene of childhood and school life; industrial hygiene; the prevention of infectious diseases and the cure of patients suffering therefrom; hygiene of the dwelling and the community; hygiene of traffic; military, colonial, and marine hygiene; and demography. The general secretary of the congress is Dr. Nietner, 9 Eichhornstrasse, Berlin, W.

ACCORDING to the *Pioneer Mail*, Allahabad, the programmes of work of the various Indian scientific departments for 1906-7 have been issued by the Board of Scientific Advice. Our contemporary states that the principal questions to be taken up by the director of the Imperial Institute and reporter of economic products are the produce of *Ficus elastica* and the developments of rubber planting in India, tanning extracts from barks, the improved preparation of agave fibre, and manganese ores. The Meteorological Department will undertake the preparation of an atlas showing the normal monthly conditions for the Indian Ocean, and the study of the upper atmosphere by kites and balloons, and of atmospheric electricity and earthquakes. The Survey Department, it is proposed, shall compile a paper summarising the geographical position of our knowledge of the Himalayas and Tibet. The Botanical Survey will conduct economic investigations regarding Indian cottons and fibre-yielding plants. The Agricultural Department will investigate remedies for injurious crop pests, and conduct investigations into the improvement of cotton, wheat, tobacco, tea, indigo, and jute. The Forest Department will examine tanning extracts.

THE report of a subcommittee of the Board of Scientific Advice on the consumption of mineral fertilisers in India has been issued by the Government of India Revenue Department. The director of the Geological Survey having reported on the possible consumption in India of sulphuric acid, and the large supply of rich phosphate of lime on Christmas Island, and the officiating inspector-general of agriculture having directed attention to the scope for the

use of mineral fertilisers in Indian agriculture, the sub-committee recommends that experiments should be made to test the results of the use of the principal mineral fertilisers. In particular, it urges that special attention should be given to the trial of sulphate of ammonia in sugar-cane cultivation. Arrangements are being made for prospecting the copper-sulphide deposits of Chota Nagpur, and if the deposits prove as valuable as is asserted by some authorities, it is thought that a large chemical and metallurgical industry may be started, the by-products of which will include sulphuric acid and ammonium sulphate.

MR. WILLIAM COLE, of Buckhurst Hill, the honorary secretary of the Essex Field Club, is endeavouring by the aid of a phonographic apparatus to perpetuate the record of Essex folk-songs and peculiarities of dialect and intonation, and solicits the assistance of residents in Essex in discovering and enlisting the services of singers of the ancient folk or cradle-songs or quaint harvest-home ballads who will not fear to face the recording-horn of the phonograph. Mr. Cole will be pleased to correspond with anyone willing to cooperate.

ACCORDING to *L'Aviculteur*, the wholesale destruction, for purposes of millinery, of certain species of birds threatens at no distant date to bring about the extermination of some of the rarer and more beautiful kinds which the world possesses. How real this danger is may be estimated by the fact that in one market alone were sold lately at one time 12,000 humming-birds, 28,000 parakeets, 15,000 kingfishers, 20,000 aigrettes, and thousands of other gorgeous southern birds of different kinds, as well as doves and even sparrows. France receives every year from America, Tonkin, and India millions of birds, which are exchanged for millions of pounds. The number of small birds annually imported into England and France may be computed at 1,500,000. Germany exports yearly twenty million feathers which are worked up in England into hat trimmings. In London there are held every month sales of birds' skins and feathers, India alone supplying some thirty millions of feathers. The South American Republics have awakened to the danger of the extermination of their most ornamental species of birds, and have passed laws regulating their slaughter. A league has been formed in America the members of which forswear the wearing of feathers; as the demand creates the supply, it is to be hoped more leagues of this kind will be formed elsewhere, and that it will be some day considered bad form for a woman to adorn her headgear or clothing with the bodies and feathers of wild birds.

M. LANCASTER, director of the Belgian Meteorological Service, states that henceforward the results of the international balloon ascents organised by that service will be published in *Ciel et Terre*. Tandem "sounding" balloons made of india-rubber are used, one of which bursts at a certain height; thermometers of two kinds are employed—Teisserenc de Bort's bimetallic instrument and Hergesell's German-silver cylindrical thermometer. In the ascents of April 5 and May 3 altitudes of 15,140 metres and 16,970 metres were attained, temperature $-52^{\circ}.5$ C. and $-38^{\circ}.0$ C., respectively. In the first experiment the lowest temperature recorded was $-57^{\circ}.4$, at 13,500 metres, during the descent; an inversion occurred at 13,940 metres during the ascent. In the second experiment the lowest temperatures were $-62^{\circ}.6$, at 10,160 metres, during the ascent, and $-61^{\circ}.9$, at 9800 metres, during the descent. A large inversion commenced at 10,160 metres, and increased to 16,970 metres, when the upper balloon burst. Both ascents were made in the morning.

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WE have received from the director of the Central Meteorological Observatory at Tokio, Japan, complete observations made every four hours, and results for 1904-5, at the Korean stations at Fusan, Chemulpo, Wonsan, and Yongampo, also for part of the year at Josin. We quote the following statistics for Wonsan (lat. $39^{\circ} 9'$ N., long. $127^{\circ} 26'$ E.), 1905, as the station having the greatest annual range of temperature. The mean of the daily maxima in July was $80^{\circ}.1$ F., and of the minima in February $17^{\circ}.6$ F.; the absolute maximum was $94^{\circ}.8$ F. in August and $2^{\circ}.1$ in January. The annual rainfall was 73.3 inches, of which 20.9 inches fell in July and about 0.2 inch in February.

MUSEUM curators should study attentively certain statements by Mr. F. A. Lucas in the report for 1905 of the Museums of the Brooklyn Institute. On the south side of the building the windows are reported to have been "sand-blasted," with the view of diffusing the light, and thus helping to protect the specimens from its ravages. The results are held to have been worth the heavy expense. The second point relates to descriptive labels, on which the author writes as follows:—"As a rule, the visitor wishes to know first the name of an animal or an object, next where it is to be found, and then what it does or is used for; and the effort is made to supply this information and not discourage the visitor with statements regarding matters of which he knows little and cares less. The technical label is the easiest to prepare, but it is the one that most visitors do not care for, while the student can get such information from text-books." If these views be sound, many of the labels in museums in this country require drastic amendment.

THE contents of *Biologisches Centralblatt* for August 1 emphasise the extent to which the problems of hybridisation and variation are occupying the attention of Continental naturalists at the present time. In the first article Dr. K. Goebel describes a double-flowered wild race of *Cardamine pratensis* which is to be found in abundance in spring on the mountains of Upper Bavaria, and discusses its bearings on the development and infertility of double flowers in general. The sexual and asexual reproduction of fresh-water polyps (*Hydra*) forms the subject of the second article, in the course of which the author, Dr. R. Hertwig, records the remarkable circumstance that while in one winter all his specimens—some thousands in number—developed ovaries and eggs, in the following season the whole series produced spermatozoa. Dr. J. Gross, in the third article, continues the discussion of the problems of modification and variation. Albinism and melanism in relation to the Mendelian theory are first discussed, after which the author takes into consideration the case of the interbreeding of black and grey crows, De Vries's mutation theory being subsequently contrasted with the Mendelian doctrine. The fourth article, by Mr. L. Plate, is devoted to a review of Hatschek's new theory of modification.

A COLLECTION of fishes—both fresh-water and marine—from Argentina forms the subject of a paper by Messrs. Evermann and Kendall, published as No. 1482 of the Proceedings of the U.S. National Museum. Three species—among them one of the exclusively southern and chiefly fresh-water genus *Galaxias*—are described as new. The physical features of the fresh-waters of the country are noted.

WE have been favoured by the author, Mr. H. R. Watkin, with copies of two papers published by the Torquay Natural History Society. One, which was read

in 1905, is a translation of the original account of the discovery and transport to St. Petersburg of the now well-known Berezovka mammoth. In discussing whiteness in animals in the second paper, the author takes occasion to dissent from the view that British park-cattle are albinos, urging as a reason that they have been white for centuries—an argument which has, of course, no value at a

ACCORDING to the *Irish Naturalist* for August, the bog-slide at Ballycumber, King's County, in June last, of which much was made in the Dublin papers, was a very insignificant affair. To the same issue Mr. R. Southern contributes notes on Irish oligochaetous worms of the genus *Enchytræus*, recording three species new to the Irish fauna, one of which appears to be also new to science.

PART vii. of the "Fauna of New England," issued as an Occasional Paper of the Boston Society of Natural History, consists of a list of the ants (Formicidæ), by Mr. W. M. Wheeler.

THE vexed question of the chemical nature of thorium and the origin of its radio-activity forms the subject of a series of papers in the *American Journal of Science* (vol. xxi., No. 126). Dr. Bertram Boltwood has determined the amount of α -ray activity due to thorium in different minerals, containing, in addition to thorium, other radio-active constituents. The values obtained clearly indicate that this activity per gram of thorium is a constant independent of the nature of the mineral. The total activity of minerals containing thorium and uranium can, indeed, be calculated from the proportions in the mineral of these elements. The constancy of the "specific activity" of thorium in different minerals is in support of the view that Hahn's radio-thorium is a degradation product of thorium itself; the transformation of thorium into radio-thorium is probably rayless. It is a remarkable fact, however, that the specific activity of thorium in samples of thorium nitrate and oxide prepared on the commercial scale for the Welsbach mantles is only about half that of thorium in the same substances prepared directly from the minerals worked with. This is explained by assuming that the commercial method of purifying thorium salts is remarkably efficient in separating radio-thorium, the change of thorium into radio-thorium occurring only very slowly. Similar conclusions were arrived at by Mr. H. M. Dadourian and by Messrs. McCoy and Ross from experiments of a somewhat different character described in the same number. The question whether thorium can be obtained entirely free from radio-thorium and completely inactive is, however, still unsettled.

THE July number of the *Journal of the Röntgen Society* contains an address by Mr. Frederick Soddy on the nature of the α ray. A clear account of recent investigations and hypotheses is given with regard to this problem, and the author, in addition, briefly refers to some experiments he has made to ascertain whether the α particle is capable of deviation in a magnetic field under conditions in which it has not suffered impact with a single gas molecule; but the results would indicate that in the highest vacuum obtainable the α rays are deflected as readily as in ordinary air. In the *American Journal of Science* for July Mr. M. Levin shows that polonium is a homogeneous source of α rays, and that the range of the α particle in air is 3.86 cm., being slightly greater than that of the α particle of radium (3.50 cm.), but less than that of the α rays of radium C (range 7.06 cm.).

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AN interesting note on the fluorescence of anthracene vapour is published by Mr. T. S. Elston in No. 4 of the Johns Hopkins University Circular. It is concluded that the light exciting the fluorescence has a wave-length of about 390 $\mu\mu$, and that the fluorescence spectrum extends continuously from $\lambda=365 \mu\mu$ to $\lambda=470 \mu\mu$, showing three distinct bands at wave-lengths 390, 415, and 432 $\mu\mu$. It is clear that for anthracene vapour Stokes's law, which states that fluorescence lies entirely on the red side of the exciting light, does not hold.

A SCIENTIFIC and not too technical exposition of the present position of certain problems connected with heredity will be found in *Naturwissenschaftliche Wochenschrift* (July 1) in an article written by Dr. E. Teichmann. The first part of the article is devoted to a review of the hypotheses and facts adduced in recent papers by Heider, Correns, and Strasburger in favour of regarding the chromosomes as bearers of hereditary characters, and showing how the chromosome divisions fit in with Mendelian principles; this part is illustrated with useful explanatory diagrammatic figures. Dr. Teichmann then gives a short account of the hypothesis advanced by Dr. Hatschek, who interprets heredity as a chemical process. Hatschek postulates generative molecules occurring in the nuclei, and energy molecules in the cells; it is by changes in the generative molecules of the reproductive cells that variations are produced. Reference is also made to Loeb's latest expression of opinion, in which he also favours a chemico-physical explanation.

IN the course of a lecture addressed to the Field Naturalists' Club of Victoria, and published in the *Victorian Naturalist* (June), Mr. D. McAlpine summarises a few of the interesting points observed in studying the plant rusts in Victoria. The geographical distribution of some of the species furnishes curious facts. The genus *Uromycladium* causing "witches-broom," and characterised by the production of a colourless cyst along with one or two spores, is only known from Java outside Australia. An *æcidium* on wallaby grass has only been found elsewhere on a species of *Stipa* in the Argentine, Chili, and California. The absence of any native barberry plants would suggest that wheat rusts in Australia forgo a heterocœcious existence, and it was found that the spores would not even infect imported plants.

THE third and concluding portion of Sir Joseph Hooker's enumeration of British Indian species of *Impatiens*, published as vol. iv., No. 3, of the Records of the Botanical Survey of India, contains the list of known species for the Western Peninsula, also for Ceylon and Malaya. The Peninsular balsams differ in sectional characters from the Himalayan and Burmese; they all fall into the short-capsuled group, and none possesses the two additional lateral sepals; many are endemic, only three being found in northern or eastern India, and one of these is the polymorphic *Impatiens balsamina*. There is some affinity between the Malabar and Ceylon species, although the majority of the latter are endemic. In marked contrast to the large number of balsams from Burma, only seven Malayan species are recorded, and none of these is found in Burma. *Impatiens mirabilis*, that is only known from one island, is a remarkable species, as it produces a branching stem 5 feet high and 22 inches in diameter, bearing leaves 6 inches to 10 inches in length.

As recent research has led to the transference of many of the so-called fossil ferns of the Carboniferous period to the pteridosperms, and has thrown doubt on others, it is a

matter of considerable interest to have a new fern recorded from the Coal-measures. The plant, consisting of axis, petioles, and root, is described by Miss M. C. Stopes in the *Memoirs of the Manchester Literary and Philosophical Society*, vol. 1., part x.; associated with these fossil remains are small annulate sporangia which, there is every reason to believe, belong to the same plant. The plant is referred to *Tubicaulis*, a fern genus, formerly monotypic, that is probably one of the simpler *Botryopterideæ*.

THE Field Naturalists' Club of Victoria, which has been in existence twenty-six years, appears to be in a very satisfactory condition, financially, numerically, and in the interest shown in the monthly meetings. During the year which ended in April last, eight papers relating to zoology were read; eleven papers dealt with botany, two with geology, and one with palæontology. The president (Mr. F. G. A. Barnard) at the annual meeting took as the subject of his address "The First Quarter of a Century of the Field Naturalists' Club of Victoria," from which we notice there are still thirteen of the original members in association with the institution.

THE *National Geographic Magazine* (the organ of the National Geographic Society of Washington) maintains its high standard of excellence, and the August issue—devoted mainly to South America—contains many articles of interest, notably one by Prof. A. Heilprin on the shattered obelisk of Mont Pelée, which is illustrated by reproductions of several striking photographs of the peculiar cone of rock which was thrown up during the volcanic activity of the mountain a few years ago, and which at the time of its greatest development attained the height of more than a thousand feet. To-day the obelisk is in ruins, consisting of boulders ranging from 2 feet or 3 feet in diameter to 30 feet, and it was to view these and to endeavour to understand the geological riddle of the mountain that Prof. Heilprin in February last paid his fourth visit to Martinique.

A FIFTH edition has been published by Messrs. Swan Sonnenschein and Co., Ltd., of "Through the Wordsworth Country: A Companion to the Lake District," by Prof. William Knight, with sixteen full-page illustrations by Mr. Harry Goodwin. In an explanatory preface Prof. Knight explains his aim as having been to be as terse and simple as possible, and not to traverse precisely the same ground as that covered in one of his earlier works. He modestly insists more than once that the merit of the book rests on Mr. Goodwin's drawings and certainly these are delightful, but lovers of Wordsworth visiting the Lake District will also find Prof. Knight an interesting and inspiring guide.

OUR ASTRONOMICAL COLUMN.

COMET 1906d (FINLAY).—A further extract from M. Schulhof's ephemeris for Finlay's comet, as published in No. 4109 of the *Astronomische Nachrichten*, is given below:—

Ephemeris (12h. M.T. Paris).

1906	α (app.) h. m. s.	δ (app.) ° ' "	$\log \Delta$	$1:r^2\Delta^2$
Aug. 18 ...	4 11 49 ...	+10 21 ...	9.44499 ...	12.56
20 ...	4 26 35 ...	+11 33 ...	9.45816 ...	12.02
22 ...	4 40 34 ...	+12 39 ...	9.47221 ...	11.44
24 ...	4 53 48 ...	+13 38 ...	9.48689 ...	10.85
26 ...	5 6 19 ...	+14 31 ...	9.50197 ...	10.25

From this it will be seen that the comet is now apparently travelling through Taurus towards the northernmost extremity of Orion, and will be about 4° south of Aldebaran on August 21, on which date it will rise a little north of east at about 12 o'clock (midnight).

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PLANETS AND PLANETARY OBSERVATIONS.—In the second of the series of articles which he is writing for the *Observatory*, Mr. Denning discusses the powers best suited for planetary observations, the best times for making the observations, and the *modus operandi* most suitable for observers with moderate equipments.

In this he emphasises the importance of noting every detail very carefully, and of keeping any one object under regular observation for as long a period as possible.

In a discussion as to the relative values of eye-estimates and instrumental observations of transit times, Mr. Denning supports the former method (the *Observatory*, No. 373).

A NEW FORM OF SPECTROHELIOGRAPH.—A new form of spectroheliograph, in which it is hoped that the effects of instrumental vibrations will be materially reduced, is proposed by MM. G. Millochau and M. Stefánik in No. 1, vol. xxiv., of the *Astrophysical Journal*.

This instrument may be fed from a cœlostast or siderostat, or attached directly to a telescope. It is moved about a horizontal axis perpendicular to the plane containing the optical axes of the spectrograph by a Brashear clepsidra mounted vertically.

By widening the primary slit at its two extremities, a photograph of a portion of the spectrum of the diffuse skylight may be obtained, thus giving an indication of the exact radiation which is being employed.

THE RELATIONS BETWEEN SCIENCE AND INDUSTRY.

THIS year's meeting of the Association française pour l'avancement des Sciences was held at Lyons, and opened on the same day as the meeting of the British Association at York. On August 1, Prof. G. Lippmann, the president of the French association, delivered his presidential address,¹ and by a significant coincidence dealt with the want of respect accorded to scientific research by French manufacturers and merchants on the same day that Prof. E. Ray Lankester was directing the attention of the visitors to York to the "less widespread interest than formerly in natural history and general science, outside the strictly professional arena of the school and university."

Prof. Lippmann found the text of his discourse in the success which has followed the attempts of the manufacturers of Lyons to benefit fully by the work accomplished by men of science. At Lyons, he said, "science and industry live together in harmony." In this district scientifically organised factories are to be found, in which it is recognised that science can give daily assistance to industrial development—a truth other parts of France are, said Prof. Lippmann, far from understanding. The mistake is too common that industry only has need of technicians, or, at least, that she need trouble only about "applied" science, taught specifically with a view to the various manufactures; and this tendency the president described as the fatal error which had caused the total production of French industries to fall from the first to the fourth rank. It is the duty of every man of science, he continued, to wage war on such false ideas, wherever met, and to substitute for them the salutary truth that success in industry is founded upon a proper regard for the methods of science. For this reason, he explained, he had decided to speak on the relations between science and industry.

It is easy to define the bond which unites science to industry. There is only one nature. The forces which mould the material world are those also which inspire the apparatus of the laboratory, which are utilised in industry, and in the arts of peace and of war. There is one science only, which is neither professorial, industrial, civil, nor military. Experimental science is the art of wielding the forces of nature—and industry and science are developed along parallel lines.

During an unknown number of centuries science was empirical and industry mere fumbling and groping. In the last hundred years science has developed more than in thousands of years previously, and industry has advanced with giant's strides. Prof. Lippmann exemplified his statements by reference to the chemical and industrial industries, and paid eloquent tributes to the creator of the

¹ The address is printed in the *Revue Scientifique* for August 11, 1906.